

## CLAIMS

What is claimed is:

1. A vehicle transmission system comprising:  
a transmission component operable in a non-engaged condition or an engaged condition where driving torque from an engine is transferred to a drive component;  
at least one sensor assembly for measuring at least one vehicle condition prior to initiation of a vehicle start maneuver, said sensor assembly being operational during both said engaged and non-engaged conditions; and  
a controller that determines whether said vehicle start maneuver is a coast start based on said vehicle condition and generates a control signal causing said transmission component to operate in said non-engaged position or causing said transmission component to maintain said non-engaged condition once said coast start is identified.
2. The system of claim 1 wherein said start maneuver comprises a release of a vehicle brake member.
3. The system of claim 1 wherein said at least one vehicle condition comprises a static vehicle condition.
4. The system of claim 3 wherein said static vehicle condition includes at least one of vehicle weight or vehicle inclination angle.
5. The system of claim 1 wherein said at least one vehicle condition comprises a vehicle operating condition.

6. The system of claim 5 wherein said vehicle operating condition includes at least one of wheel speed, transmission component output speed, or transmission ratio.
7. The system of claim 1 wherein said transmission component comprises a clutch.
8. The system of claim 7 wherein said controller directly controls said clutch by automatically actuating a movable clutch member that operates a clutch engagement member.
9. The system of claim 7 wherein said controller comprises an engine controller that indirectly controls engagement of said clutch by controlling engine speed.
10. The system of claim 1 wherein said transmission component comprises a range gear box.
11. The system of claim 1 wherein said transmission component comprises a splitter.
12. The system of claim 1 wherein said controller monitors and compares engine speed to transmission component speed during the coast start, and moves the transmission component into said engaged condition when the engine and transmission speeds are both within a common predetermined speed range.

13. The system of claim 12 wherein said controller automatically adjusts a transmission ratio prior to moving the transmission component into said engaged position and subsequently to said coast start.

14. The system of claim 12 wherein said controller automatically initiates a warning to indicate a coast direction that is different than an engaged transmission component direction.

15. A vehicle transmission system comprising:

a main gear box having an input shaft adapted to receive a driving input torque from an engine and an output shaft adapted to transfer said driving input torque to a drive component;

a clutch defining an engaged condition where said input shaft is coupled to the engine and a non-engaged condition where said input shaft is uncoupled from the engine;

at least one sensor assembly for measuring at least one vehicle condition during a vehicle start maneuver, said sensor assembly being operational during both said engaged and non-engaged conditions; and

a controller that identifies whether said vehicle start maneuver is a coast start based on said vehicle condition and generates a control signal causing said clutch to operate in said non-engaged condition or maintain said non-engaged condition once said coast start is identified.

16. The system of claim 15 wherein said controller directly controls said clutch by automatically actuating a movable clutch member that operates a clutch engagement member.

17. The system of claim 15 wherein said controller comprises an engine controller that indirectly controls engagement of said clutch by controlling engine speed.

18. The system of claim 15 wherein said controller monitors input shaft speed during said coast start and prevents operation of said clutch in said engaged condition until engine speed matches input shaft speed.

19. The system of claim 15 wherein said controller determines if vehicle speed exceeds a speed condition where input shaft speed matches engine idle speed during said coast start, generates a first subsequent control signal to command engine speed to match input shaft speed once said controller identifies that vehicle speed exceeds said speed condition where input shaft speed matches engine idle speed, and generates a second subsequent control signal to engage said clutch when engine speed matches input shaft speed.

20. The system of claim 15 wherein said at least one sensor assembly comprises a plurality of sensor assemblies and wherein said at least one vehicle condition comprises a plurality of vehicle conditions, said controller identifying said coast start based on a plurality of vehicle conditions.

21. The system of claim 15 wherein said vehicle condition comprises vehicle inclination angle.

22. The system of claim 15 wherein said vehicle condition comprises at least one of wheel speed, drive component speed, or input shaft speed.

23. The system of claim 15 wherein said vehicle condition comprises at least one of a transmission ratio or prior driving condition.

24. The system of claim 15 wherein said controller determines an engaged transmission gear direction when said clutch is in said engaged condition, identifies a coast direction if said vehicle start maneuver is determined to be a coast start, and automatically notifies a vehicle operator if said coast direction is different than said engaged transmission gear direction.

25. The system of claim 24 wherein said controller generates a visual or audible warning if said coast direction is different than said engaged transmission gear direction.

26. The system of claim 24 wherein said controller generates a brake signal to automatically apply vehicle service brakes if said coast direction is different than said engaged transmission gear direction.

27. The system of claim 24 wherein said controller generates a clutch signal to at least partially engage said clutch if said coast direction is different than said engaged transmission gear direction to provide tactile feedback to an operator indicating said coast direction is different than said engaged transmission gear direction.

28. A method for controlling a vehicle transmission that includes an input shaft adapted to receive a driving force from an engine, an output shaft adapted to transfer torque to a drive component, and a clutch that selectively couples the input shaft to the engine to define an engaged position, comprising the steps of:

(a) measuring at least one vehicle condition prior to or during initiation of a vehicle start maneuver;

(b) identifying whether the vehicle start maneuver is a coast start based on the vehicle condition; and

(c) generating a control signal causing the clutch to operate in a non-engaged position or causing the clutch to remain in a non-engaged position if the vehicle start maneuver is a coast start.

29. The method of claim 28 wherein step (c) further includes maintaining the clutch in the non-engaged position until a predetermined condition is satisfied.

30. The method of claim 29 wherein the predetermined condition comprises engine and input shaft speeds both being within a common predetermined speed range.

31. The method of claim 30 wherein step (a) further includes measuring at least one of drive component speed, input shaft speed, transmission ratio, or prior driving condition as the vehicle condition.

32. The method of claim 31 including the step of (d) adjusting a transmission ratio once a coast start is identified to provide a smooth engagement transition.

33. The method of claim 31 including the steps of measuring input shaft speed, measuring engine speed, and engaging the clutch when the input shaft speed approximately matches the engine speed.

34. The method of claim 31 including the steps of measuring vehicle speed, measuring input shaft speed, determining if vehicle speed exceeds a speed condition defined as input shaft speed approximately matching engine idle speed, commanding engine speed to approximately match input shaft speed if the vehicle speed exceeds the speed condition, and engaging the clutch when the input shaft speed approximately matches the engine speed.

35. The method of claim 30 wherein at least one vehicle condition comprises a plurality of vehicle conditions and step (a) further includes measuring drive component speed, input shaft speed, transmission ratio, or prior driving condition as the vehicle conditions.

36. The method of claim 28 including the steps of determining a coast direction once the coast start is identified, determining an engaged transmission gear direction if the clutch is engaged, and automatically warning a vehicle operator if the coast direction is different than the engaged transmission gear direction.

37. The method of claim 28 including the step of directly controlling the clutch by automatically generating the control signal to actuate a movable clutch member operably coupled to a clutch engagement member.



38. The method of claim 28 including the step of indirectly controlling clutch engagement by controlling engine speed.